CDU-AC5 Web Server/MODBUS Gateway

INSTALLATION GUIDE

Issue 1.0

CONTENTS

INTRODUCTION

1.1   General

This guide describes the basic Installation, Configuration and Operation of the CDU-AC5 Web Server and MODBUS gateway. The CDU-AC5 is a multi-function communication gateway that provides a means to monitor and control CDU cabinets via a number of standard Internet and Building Automation protocols.

SYSTEM OVERVIEW

2.1   Features and Capabilities

- *Graphic Hosting*. Hosting of schematics which can real-time data fields retrieved from the locally connected CDUs via the LonWorks network. Adjustment of set points and other configuration property values is provided with relevant security schemes. Schematics can be viewed from Windows Internet Explorer, and achieved with the support of a signed ActiveX control.

- *Alarming & Re-transmission*. Generation and storage of alarms from local CDUs. Re-transmission via E-mail or SMS (requires GSM Modem).

- *Data Logging*. High capacity logging to miniSD card. Multiple sources and log intervals are supported.

- *SNMP*. SNMP agent support, providing a monitoring solution to existing network management systems.

- *MODBUS*. MODBUS slave support via a RS-485 serial communication link, providing a monitoring solution to any Building Management System (BMS) that supports MODBUS RTU protocol.
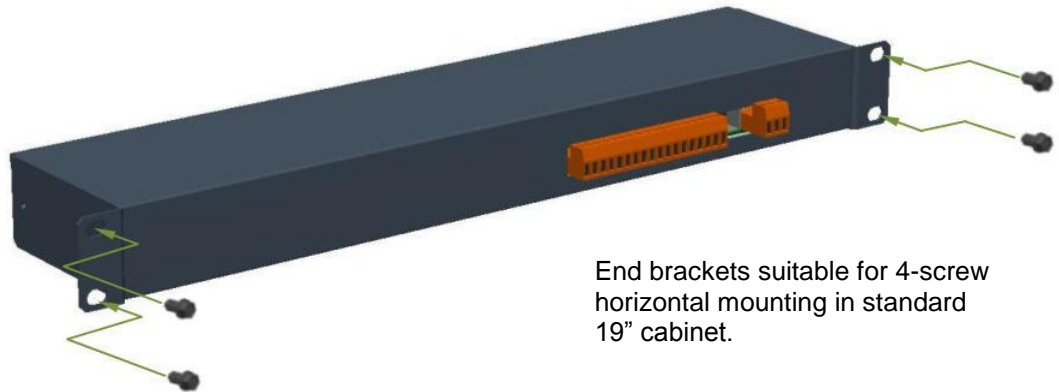
2.2   Architecture
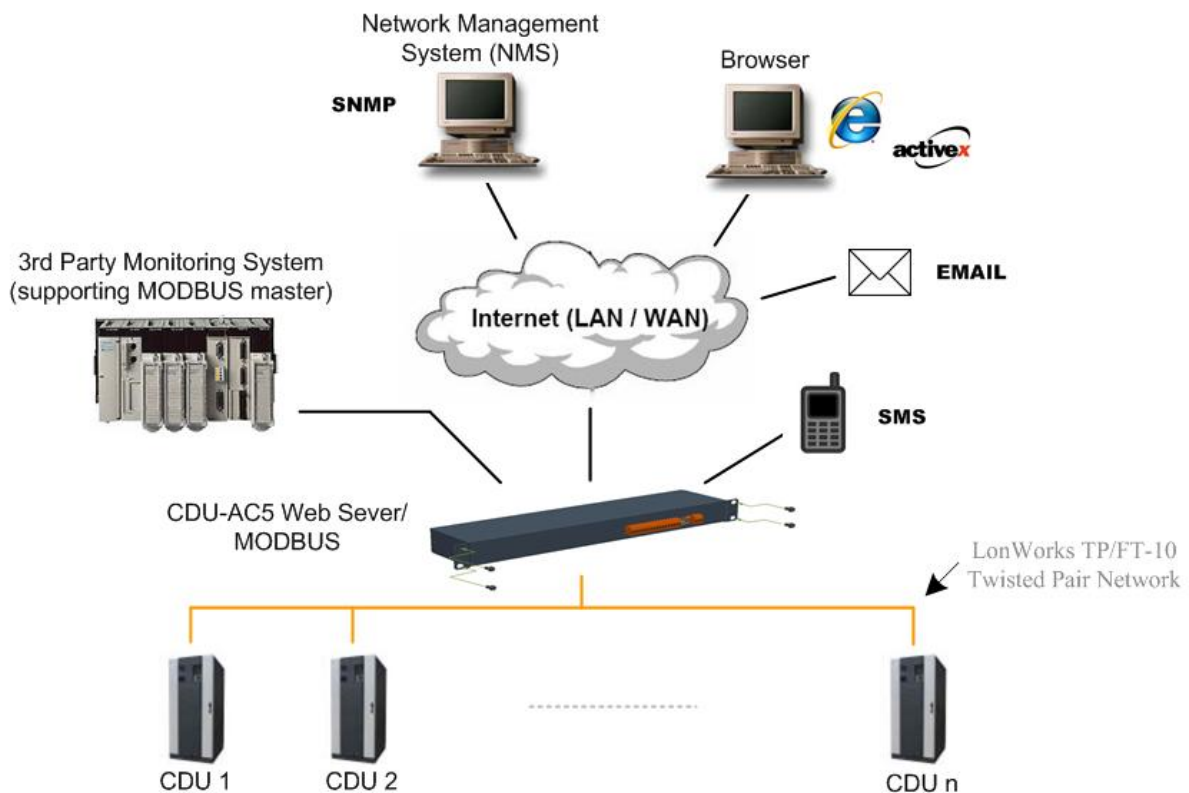
TECHNICAL DATA

3.1 Mounting

The CDU-AC5 is supplied with two sets of end brackets which allow mounting in either a standard 19" cabinet or a CDU cabinet.

3.1.1 Cabinet Mounting

End brackets suitable for 4-screw horizontal mounting in standard 19" cabinet.

3.1.2 CDU Mounting

Alternative end brackets suitable for 1-screw vertical mounting to CDU frame member– bottom bracket locates with tabs in frame upright slots.
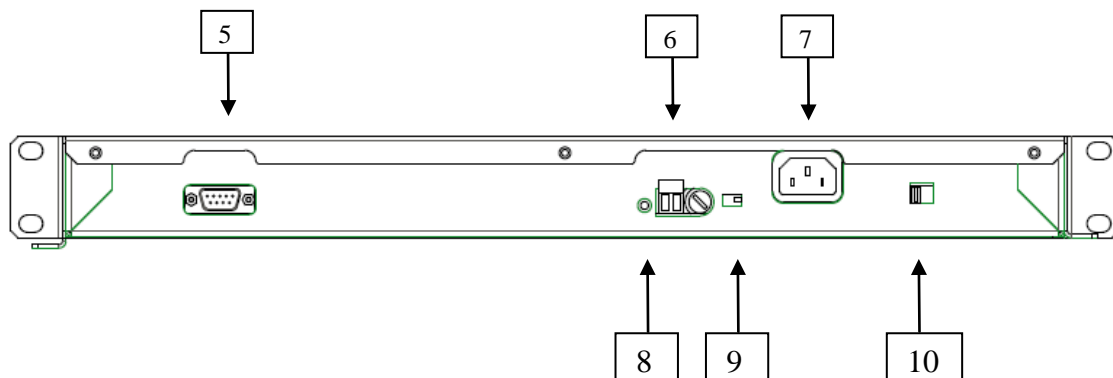
3.2 Wiring Connections

The CDU-AC5 is provided with a series of two part screw wiring terminals and a RJ-45 data connection. In addition, there is a DB-9 communication port for connection to a GSM modem and several other connections which are not utilised.

Front View
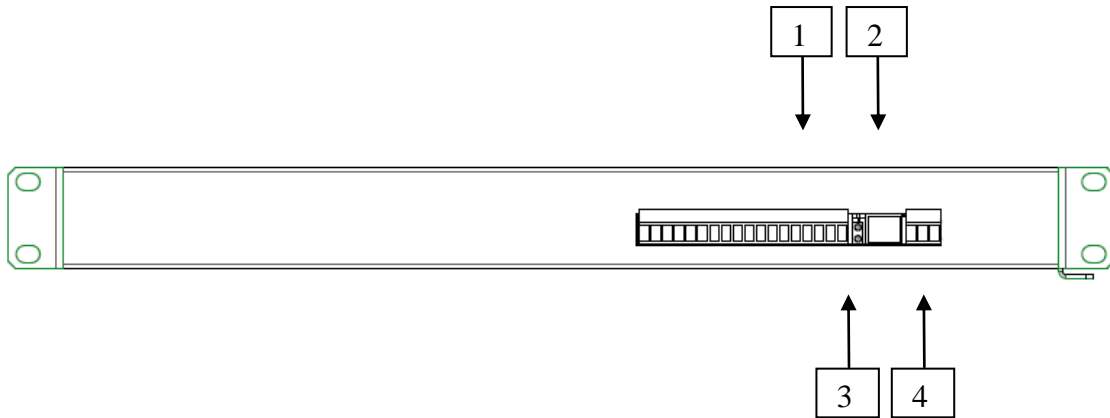
Rear View

1 CDU LonWorks Data Port.
The LonWorks data port provides connection to the local CDUs via a polarity independent twisted pair.

2 RJ-45 10/100 BaseT Ethernet Port.
The RJ-45 connector must be used with a RJ-45 male connector and a suitable Category 5 or Category 6 data cable connected to a 10BaseT or 100BaseT channel. On power-up, the CDU-AC5 will automatically adjust to the speed of the data port.

4 RS-485 MODBUS Port.
Two part screw terminal, for connection to MODBUS master device. +,- and GND signals available.

5 DB-9 RS232 Serial Port.
Standard serial port for connection to optional GSM modem.

6 24Vac power supply terminal
Two part screw terminal for connection to 24Vac power supply.

7   Mains power supply terminal
IEC socket for connection to mains power supply.

3.3   LED Indicators, Switches and Buttons

3   Unit Status LED (Green).
Indicates status of unit. Flashing 1 second interval indicates healthy condition.

8   LonWorks Service Button
Used to generate `Servie pin message'. This is used during the configuration of CDUs.

9   24V/Mains Selector Switch
Used to select between external 24Vac and mains power supplies.

10 230V/115V Selector Switch
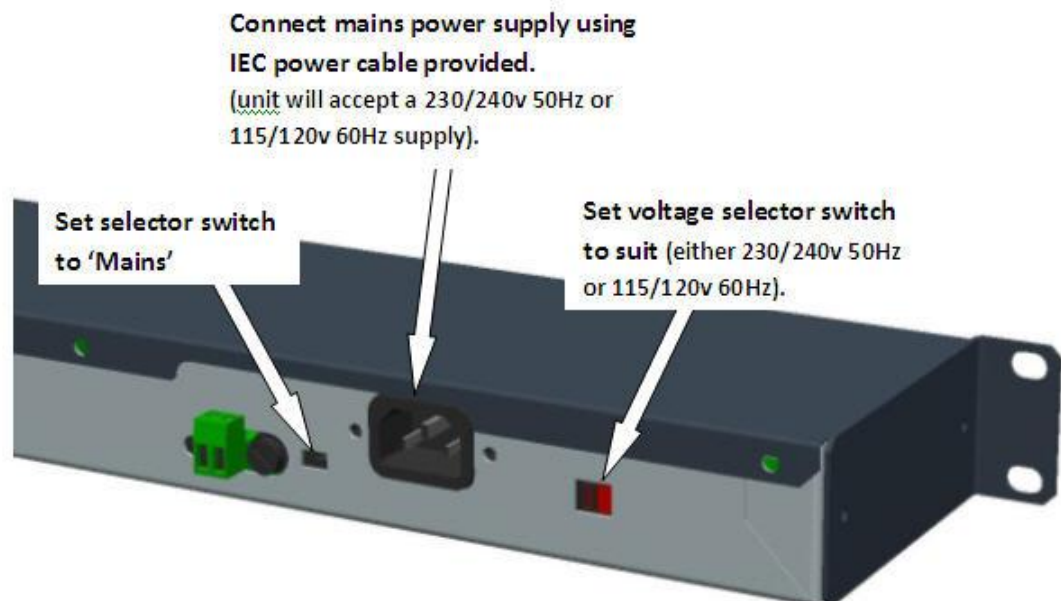Used to select between 115V or 230V mains power supplies.

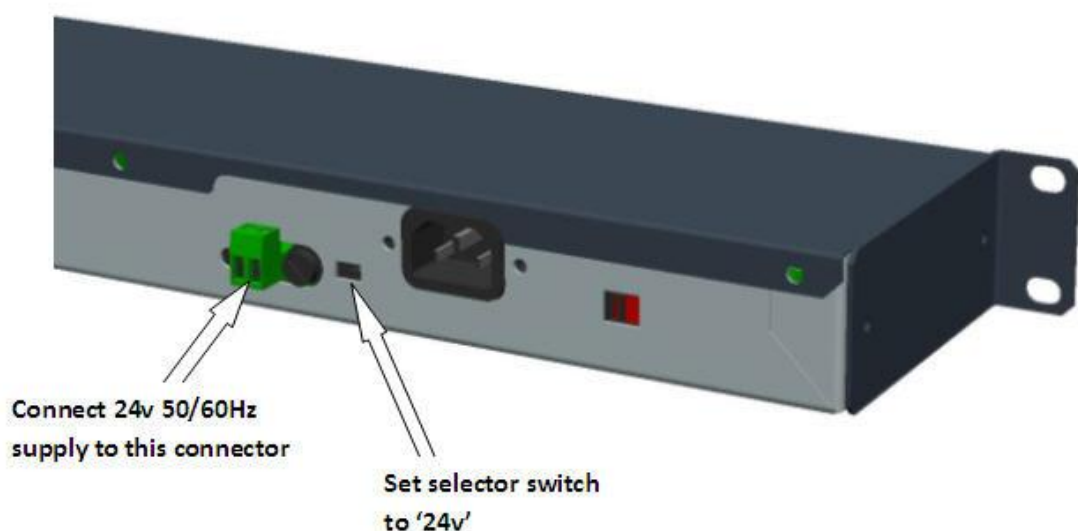# INSTALLATION   Section 4

4.1   Power Supply

The CDU-AC5 can be powered by either a local 24Vac or mains supply. Typically, you will use 24Vac if the CDU-AC5 is mounted in a CDU and mains if it is rack-mounted.

Mains Power Supply Option

Connect mains power supply using IEC power cable provided. (unit will accept a 230/240v 50Hz or 115/120v 60Hz supply).

Set selector switch to 'Mains'

Set voltage selector switch to suit (either 230/240v 50Hz or 115/120v 60Hz).

24Vac Power Supply Option

Connect 24v 50/60Hz supply to this connector

Set selector switch to '24v'

NOTE: The CDU-AC5's 24Vac power supply is polarity sensitive – it is extremely important to get the 24v & 0v in the correct orientation to avoid damage to the CDU-AC5

4.2   Local LonWorks Network

The CDU-AC5 communicates with connected CDUs over a LonWorks twisted pair network. A typical network is shown in below,
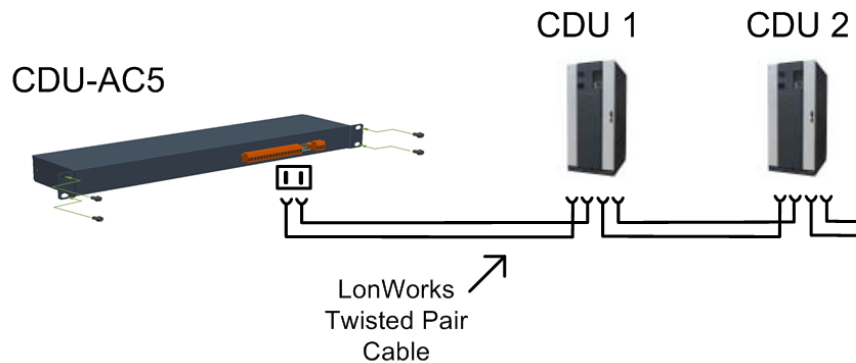
4.3   Accessing the CDU-AC5

The CDU-AC5 can be accessed from a client PC running Microsoft Internet Explorer 5 or above. The following security options must be enabled within Internet Explorer,

- Scripting
- Active X Controls

The CDU-AC5 communicates using a number of standard and non-standard TCP ports. If access is to be gained through a firewall, the following ports are should be open.

- 20-21
- 80
- 44000 – 44002
- 50000 – 50010

The default IP configuration of the web server is

- IP Address   192.168.11.22
- Subnet Mask   255.255.255.0
- Default gateway   0.0.0.0

4.4   Installing the Active-X control

When accessing a CDU-AC5 for the first time, an Active-X control will be downloaded and installed on the client PC. The download is an automated process - the user only needs to confirm several security prompts.

CONFIGURATION   Section 5

5.1   General

A CDU-AC5 can monitor and control a number of CDUs. The number of CDUs which can be connected to the CDU-AC5 is dependent on the CDU-AC5 firmware. As of writing the following firmware images are available,

CDU-AC5 Firmware Version	Maximum number of CDUs
3CDU 1.0.0 onwards	3
8CDU 1.0.0 onwards	8

A CDU must be connected to the CDU-AC5 gateway using the procedure documented in this section.

5.2   Configuring the CDU's Network Address

Before a CDU can be attached to the CDU-AC5 gateway it must be given a unique network address. Typically, network addresses are allocated to CDUs in ascending order, starting from 1. Configuration of the CDU network address is carried out via the CDU's graphical display.

    i.   Logon at Service Level or above.
   ii.   Navigate to `Connectivity->N/W Address'` (screen level 8-1)
  iii.   Press `OK`
  iv.   Enter the required network address

> N/W Address
> Use Arrow keys
>   01
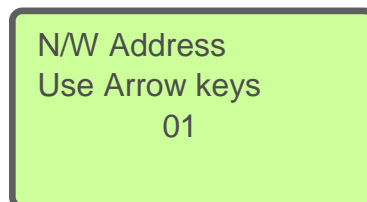
   v.   Press `OK`

5.3   Attaching the CDU to the CDU-AC5

    i.   Logon at Service Level or above.
   ii.   Navigate to `Connectivity->Web Server->Attach` (screen level 8-2-1)
  iii.   Press `OK`. The screen shown below will be displayed.

> Attach
>
> Press serv. pin
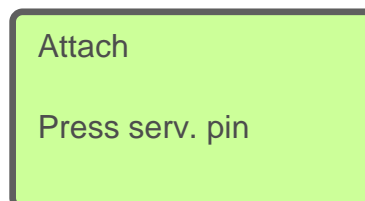
  iv.   Press the Service button of the CDU-AC5.
   v.   The screen will report the status of the attachment process. A series of screen updates will be displayed.

```
Attach

Updating domain
x of y
```

```
Attach

Updating address
x of y
```

```
Attach

Updating nv
x of y
```

vi.   When the process is completed the following screen will be displayed.

```
Attach

Setup complete
Press OK
```

vii.   Press OK

5.4   CDU-AC5

To access the configuration of the CDU-AC5 select `Configuration` from the `NeOSS` menu.

You will be asked to `Logon`. Enter the username and password.

5.4.1 General

The General screen allows you to configure the basic parameters of the CDU-AC5.

Site Name
Provides a space to enter the site name of the CDU-AC5. The site name is used to cache schematics on the hard disk of the client PC.

Default Schematic
Provides a space to enter the default schematic which is displayed when a user connects to the CDU-AC5 without providing a valid username or password.

External Address
Not used in current release

Command Port/Reflex Port/IP Data Port (Default = 44000/44001/44002)
These ports used by the web-client (Internet Explorer etc) and the CDU-AC5.

HTTP Port (Default = 80)
Provides a space to enter the port number to be used by http. Normally this is set to the standard value of 80, and would only be changed if multiple web servers are present.

FTP Port (Default = 21)
Provides a space to enter the port number to be used by ftp. Normally this is set to the standard value of 21, and would only be changed if multiple CDU-AC5 or ftp servers are present.

Passive FTP Ports (Default = 50000 to 50010)
Provides a space to enter the range of port numbers to be used by ftp.

IP Address
Provides a space to enter the Internet Protocol (IP) static address of the CDU-AC5. This address will be supplied by your network administrator.
NOTE: DHCP is not supported.

Subnet Mask
Provides a space to enter the subnet mask number obtained from your network administrator. This number is combined with the IP Address number to identify which network segment the CDU-AC5 is on.

Gateway
Provides a space to enter the address of the default gateway. This is the address of a local IP router which is used to forward traffic to destinations beyond the local network.

DNS Server
Provides a space to enter the address of the DNS Server. This server is used to resolve DNS names to IP Addresses of DNS names queried by the CDU-AC5 that can not be resolved using local name resolution information.

SMTP Host
Provides a space to enter the name of the SMTP host. This is the name of email server that the CDU-AC5 uses to send email messages to. This field is required if alarms or datalogs are to be sent via email.

Email from Address
Provides a space to enter the address that should appear in the `from' field of emails generated by the CDU-AC5. This field is required if alarms or datalogs are to be sent via email.

Modifying Configuration

1. Modify the required values
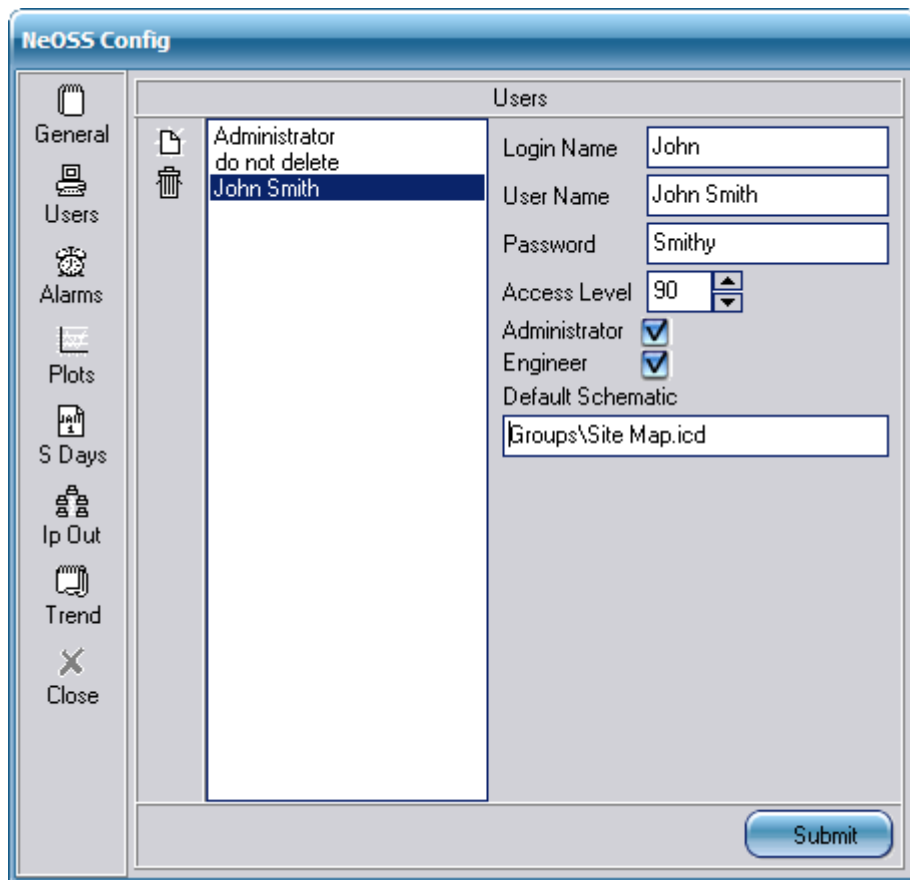2. Click `Submit.` The following message box will be displayed,
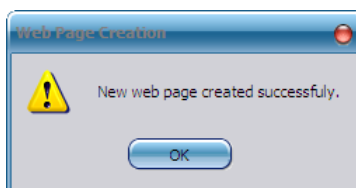
3. Click `OK`
4. Click `Close`
5. If you changed the IP settings (`IP Address, Subnet Mask, Gateway`) the following message box will be displayed.
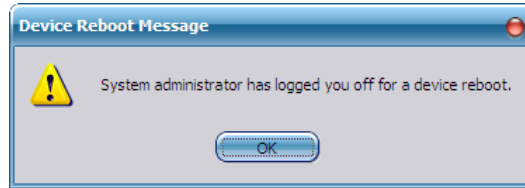
6. Click `OK`. The CDU-AC5 will perform a reboot. Once complete, you may log on again.

5.4.2 Users

The Users screen allows you to manage the user database.

Adding a User

2. Click on the New User icon, .
3. Enter the required `Login Name`, `User Name` and `Password`.
4. The `Access Level` should be set accordingly,

> < 90 if adjustments to CDU parameters are not to be permitted from the schematics.
> >= 90 if adjustments to CDU parameters are required

5. Select `Engineer` if access to the configuration options is required
6. Select `Administrator` if access to the Users is required.
7. Single left click on the `Default Schematic` entry field. A window will be displayed which allows you to select the default schematic. The default schematic is the schematic which is initially displayed when the user logs on.
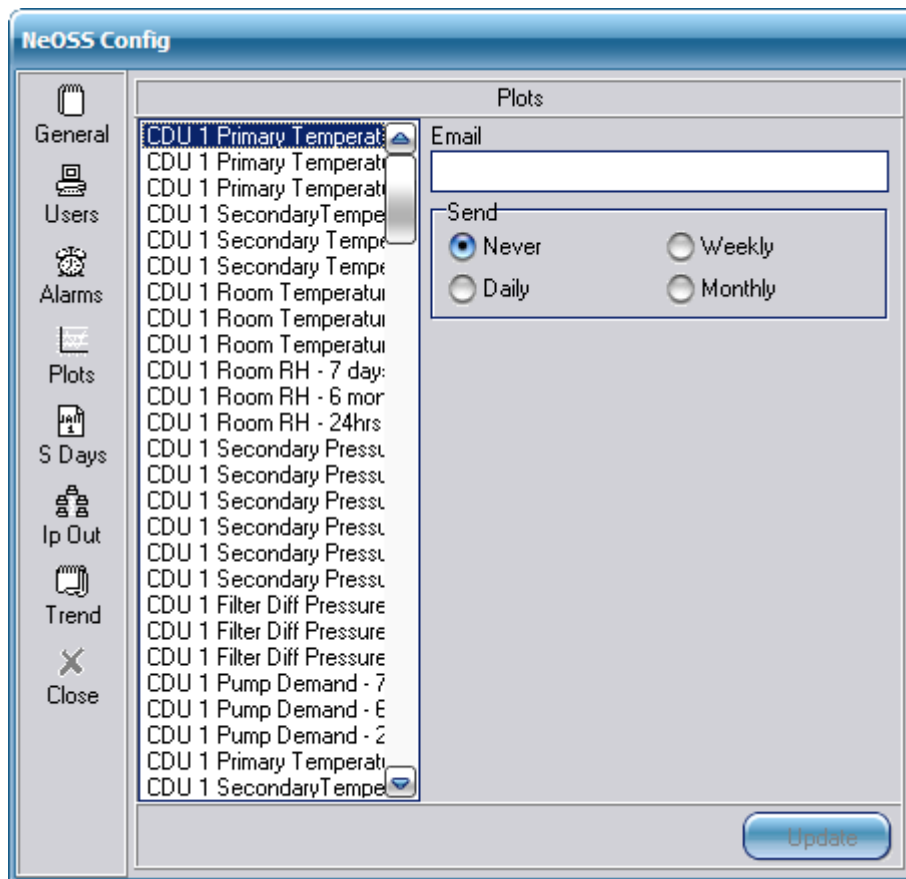
8. Click Submit

Deleting a User

1. Highlight the User to delete in the current User Name list.

2. Click on the Delete User icon,   🗑 .

5.4.3   Alarms
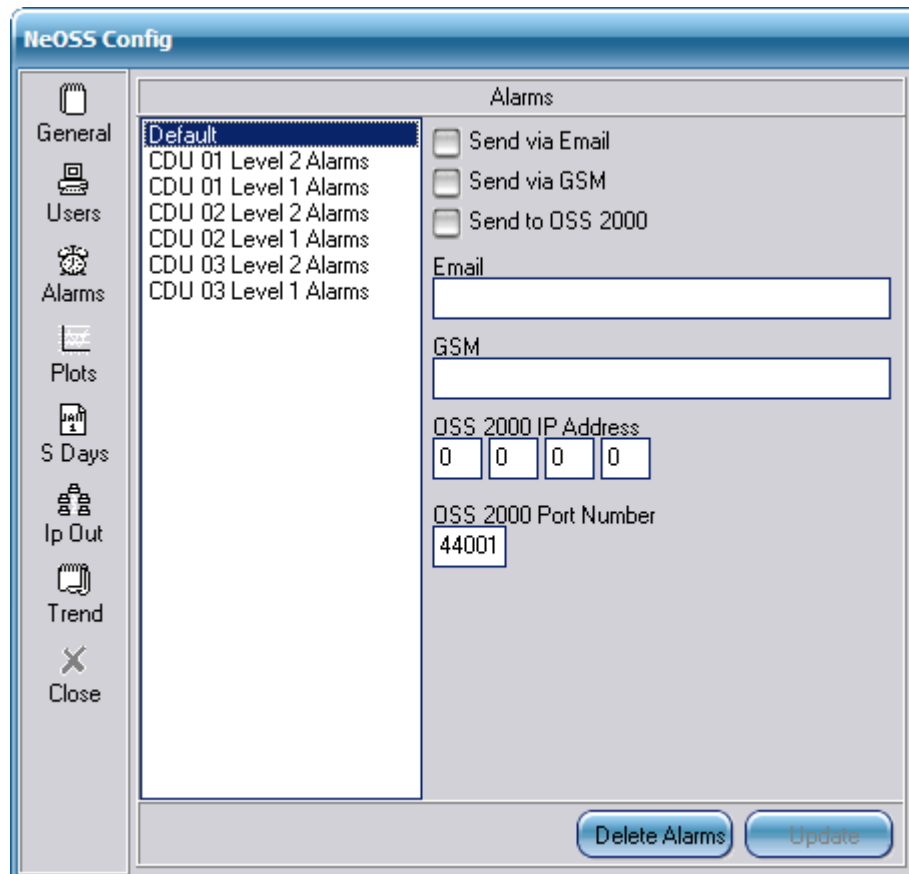
The alarms screen allows you to configure re-transmission options for alarm groups. The `Delete Alarms` button is used to delete the archived alarm list.

5.4.4 Plots

The plots screen allows you to configure when plots (datalogs) are emailed out.

5.4.5 S Days,Ip Out and Trend.
These screens are not utilised in this release.

5.5   Personalising the Site Map Schematic

The site map is normally the default schematic which is displayed when a user logs on to the CDU-AC5 and presents the CDUs which are attached to the CDU-AC5.

A newly installed CDU-AC5 will not be attached to any CDUs –this is represented by the following site map schematic.
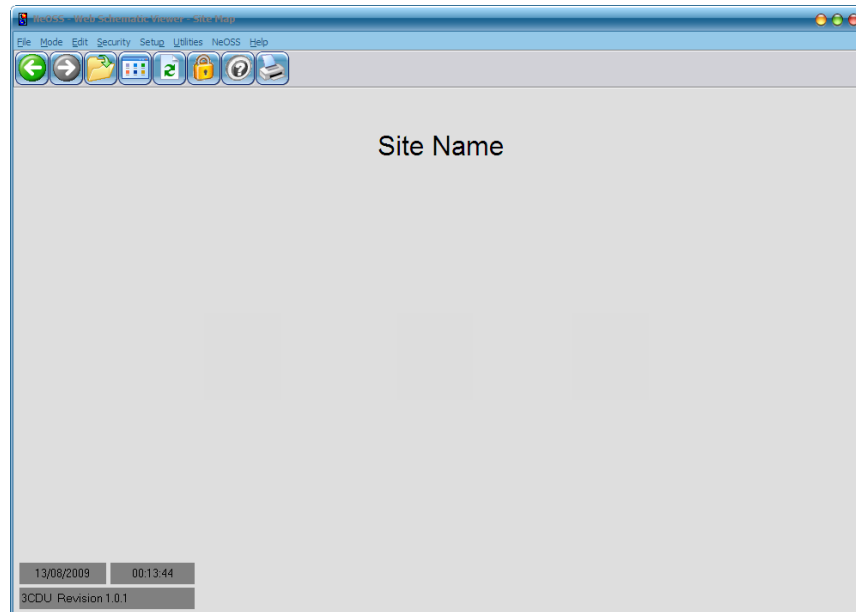
Once you have attached a CDU to the CDU-AC5 (see section 5.1 and 5.2), a CDU icon will be displayed on the site map. In the schematic shown below, a CDU with network address #1 has been attached.
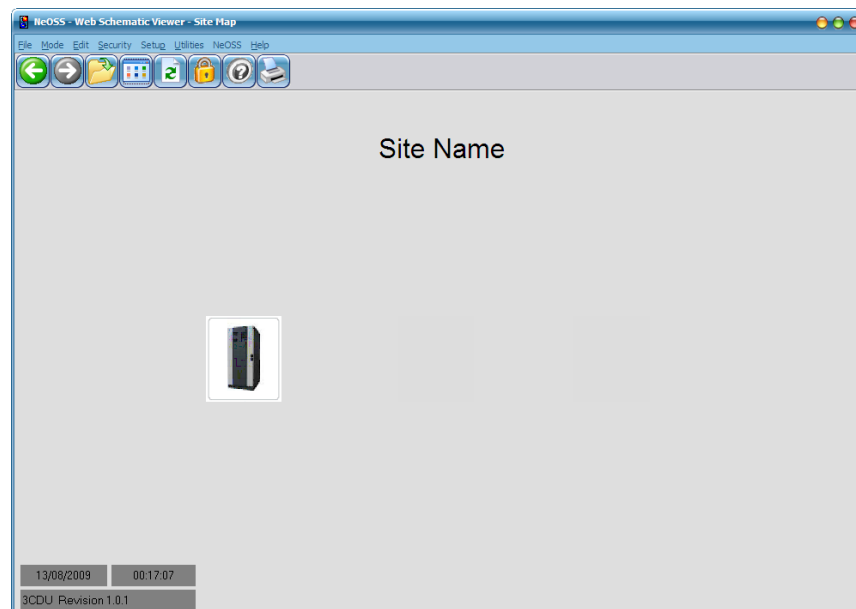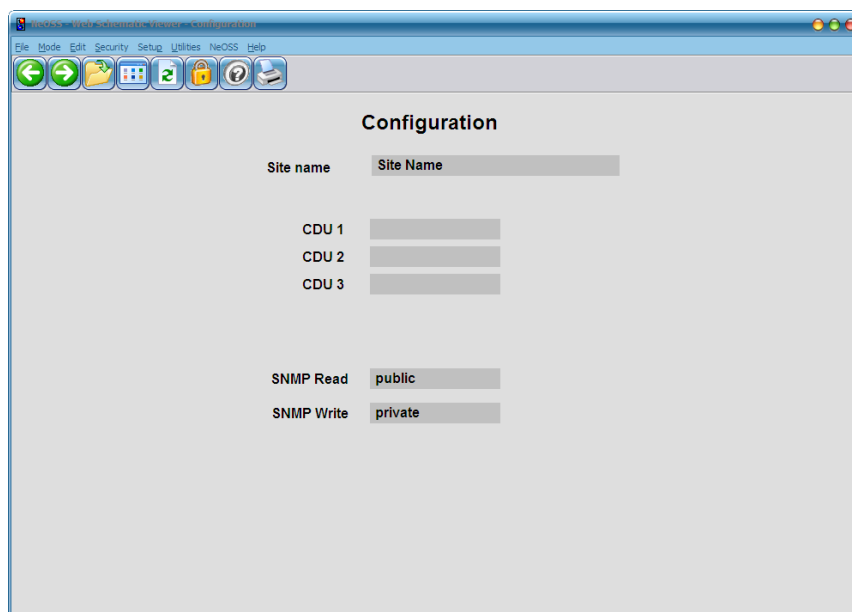

Attaching a CDU with Network address #2, #3 etc will be represented by CDU icons positioned to the left of CDU #1.
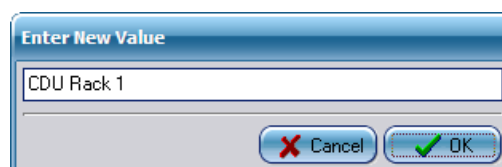
Naming the Site Map

1. From the Menu, select `File -> Open ->In Main Window.`
2. Select the `Configuration` schematic as shown below,
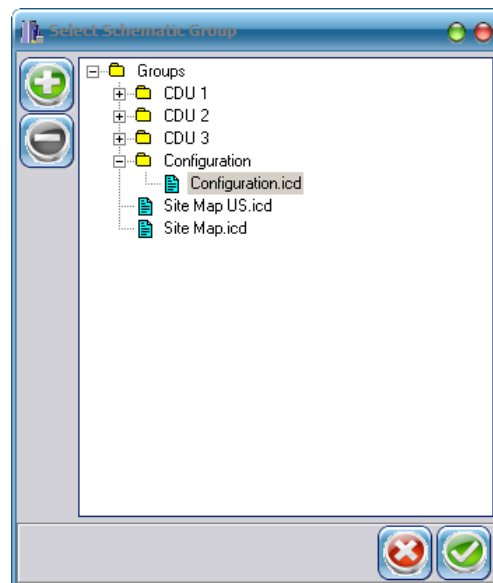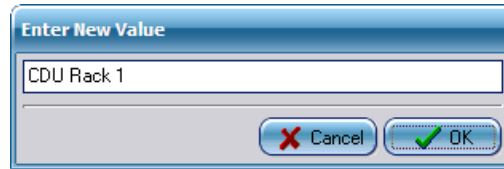

3. The following schematic will be displayed.

4. Click on the `Site Name` entry field to display the Enter New Value dialog.

5. Enter the required and click `OK`

Naming a CDU

1. Open the `Configuration` schematic as described in `Naming Site Map'
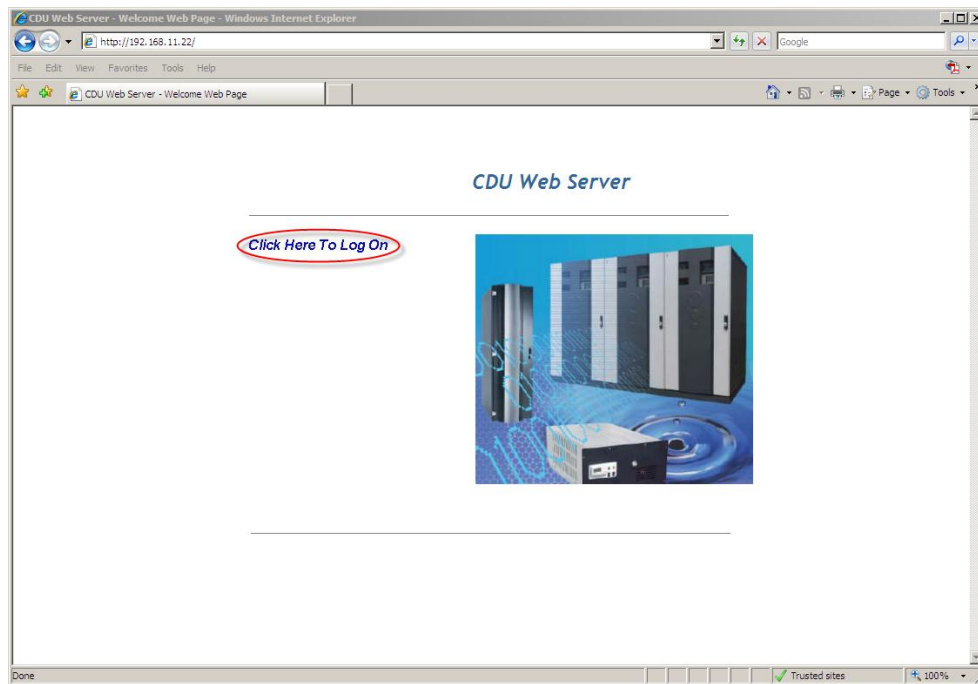2. Click on the appropriate `CDU x` entry field to display the Enter New Value dialog.
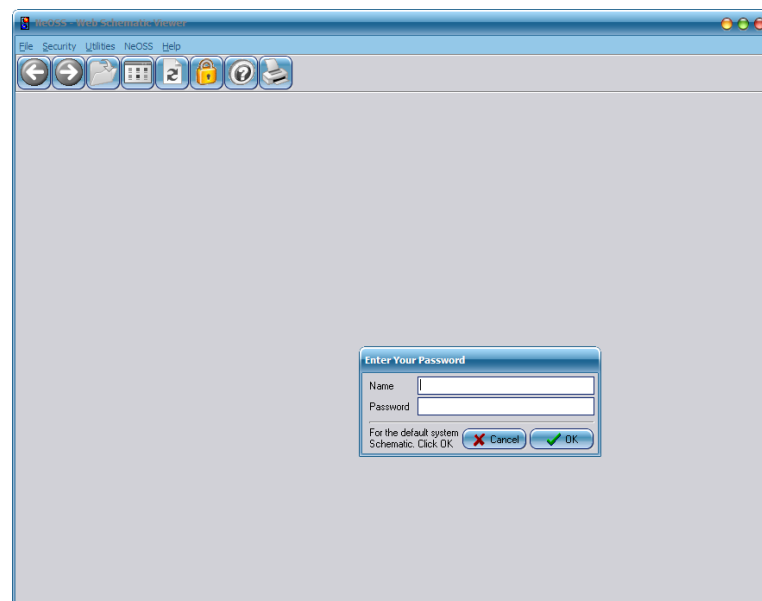

3. Enter the required and click `OK`.

OPERATION

6.1 Logging On

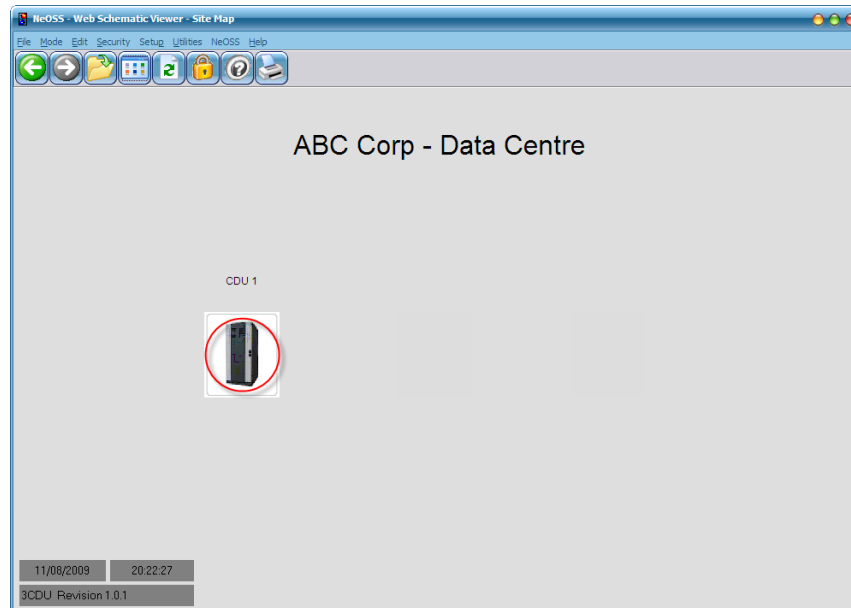From the web page, click `Click here to Log On'.

The schematic viewer ActiveX control will be launched and a logon dialog box will be displayed – enter the appropriate username and password.
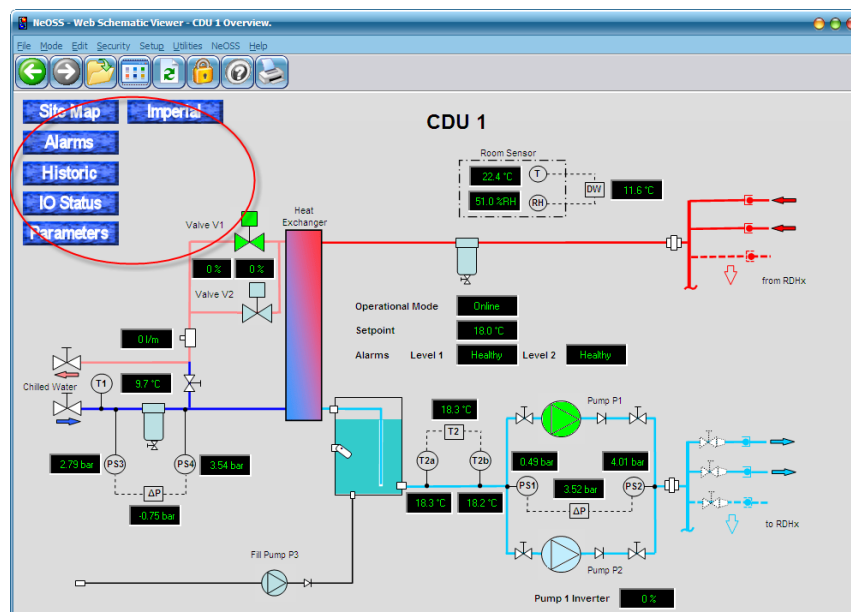
6.2 Navigating Schematics

The site map is the default schematic displayed when the user logs on. To navigate to the CDU click the appropriate CDU picture.
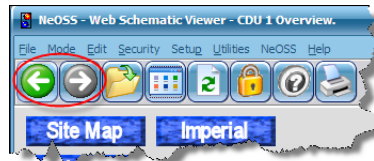

The user may easily navigate between schematics by clicking on the blue marble buttons.

To return to the default schematic click the Default schematic button as shown below,

In addition, the user may step backwards or forwards through the schematics they have previously viewed by clicking the buttons shown below,

6.3 CDU Schematics

6.3.1 Overview

The overview schematic provides an at-a-glance status of the CDU. It is presented as a piping backdrop onto which are positioned a number real-time data points. These data points are either numerical values or state bitmaps.
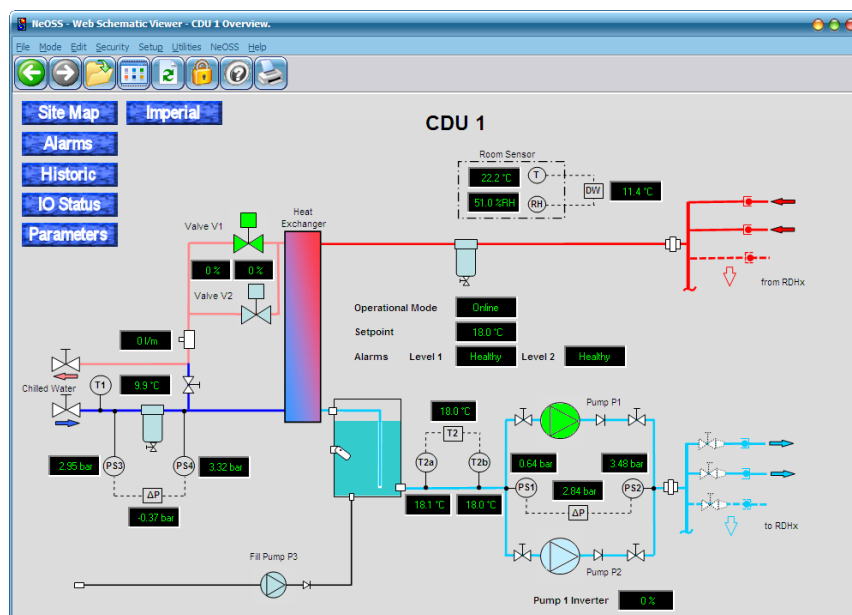
For the secondary pumps and fill pump, the following bitmaps are used to indicate their state,

Pump OFF   Pump ON

For the heat exchanger valves the following bitmaps are used to indicate their state,
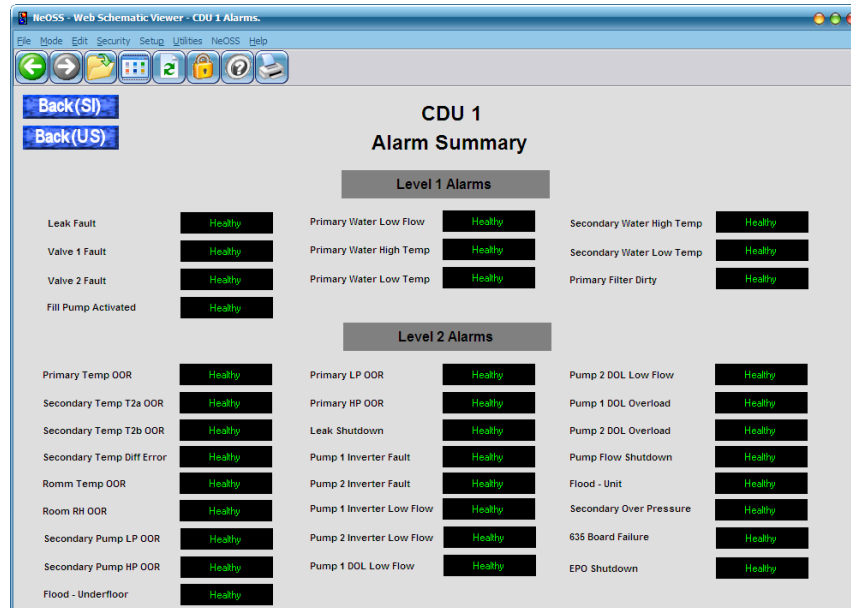

Valve Closed   Valve Open

6.3.2 Alarms

The alarms schematic lists all possible Level 1 and Level 2 alarms along with their current status. The current status can be Healthy (no alarm), ACTIVE or ACTIVE –Deferred.

To view the historic alarm list please refer to section 6.4.

6.3.3 Historic

The Historic schematic provides access to historic data logs, in addition to indicating the run hours of the pumps and valves.
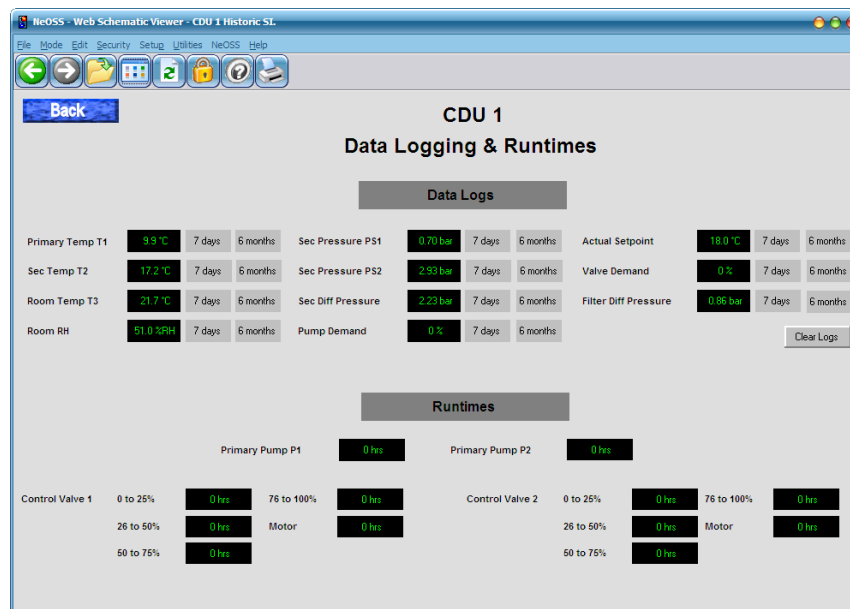

Displaying a Datalog

The datalog section provides access to historic trending data for a number of CDU data points. For each data point the user may access one of three data logs,

- The last 24 hours, logged at 1 minute intervals.
- The last 7 days, logged at 5 minute intervals
- The last 6 months, logged at 15 minute intervals

Click on the current value to retrieve the 24 hour data log. Click on the 7 days button or the 6 month button to retrieve the 7 day and 6 month data log respectively.

The following screen illustrates a typically data log,
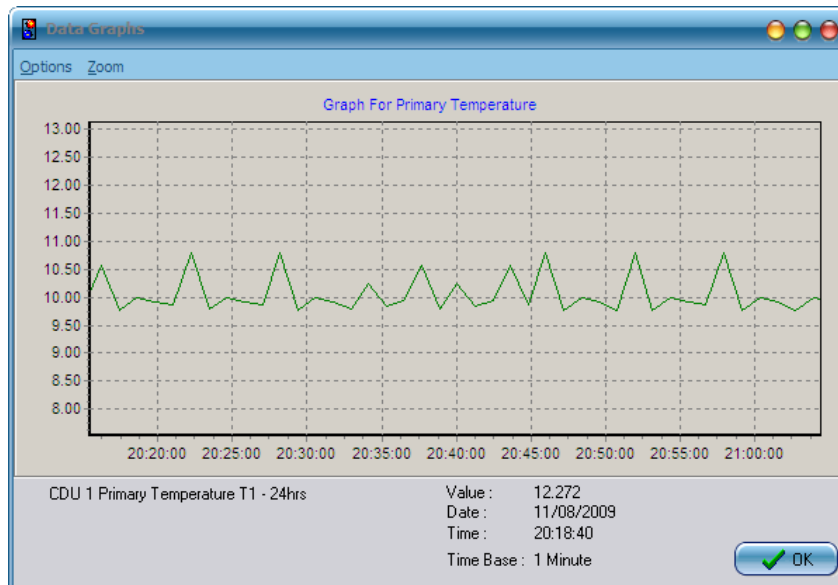
Saving a datalog to CSV

You may save the datalog values to a CSV file on your local hard disk. From the Data graph menu select `Options->Export Data`.

6.3.4 Input/Output Status

The I/O Status schematic provides all CDU low-level hardware input and output values for diagnostic purposes. In addition, the `reset info' is displayed towards the bottom of the screen.
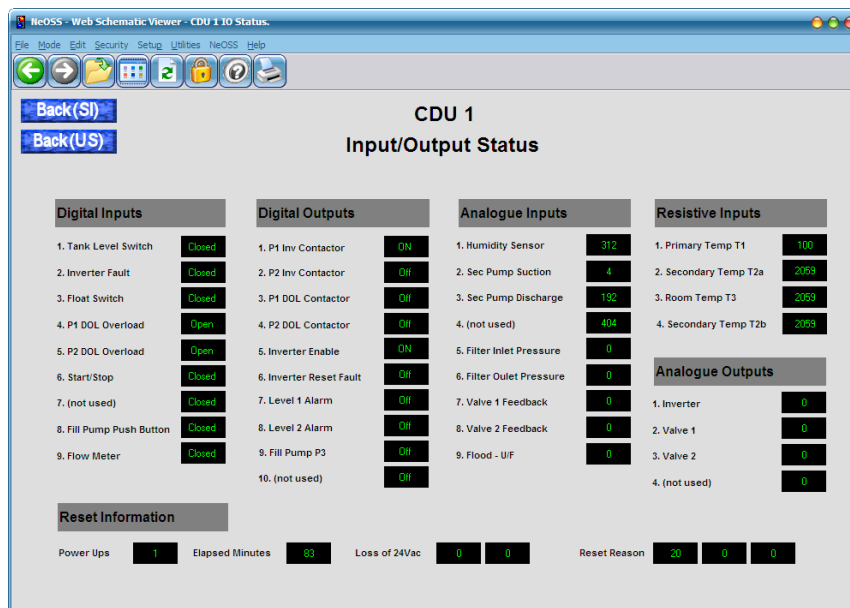
Digital Inputs
Displays the current state of each of digital input. The state can be either Open (circuit) or CLOSED (circuit).

Digital Outputs
Displays the current state of each of digital output. The state can be either Off or ON.

Analogue Inputs
Displays the current state of each of analogue input. Each input is able to accept a signal in the range of 0V to 18V or 0mA to 36mA. For inputs 1 to 4, this input range corresponds to 0 to 4096 bits. For inputs 5 to 9, this input range corresponds to 0 to 1024 bits.

Resistive Inputs
Displays the current state of each of resistive input. The value displayed is in multiples of 100ohms. E.g. 61 = 6k1ohms.

Analogue Outputs
Displays the current state of each of analogue output. Each output is specified as 0 to 10V – corresponding to a displayed value of 0 to 255.
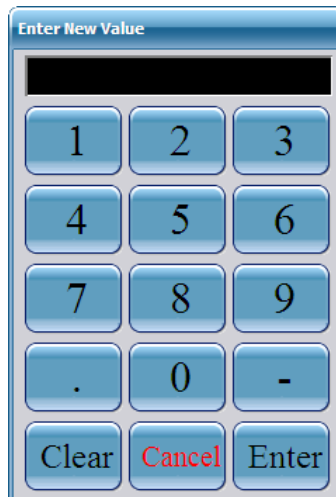
6.3.5 Parameters
The two parameter schematics (Parameters – Page 1 and Parameters – Page 2) provide access to all CDU parameters. You may adjust parameters if you have sufficient user account privileges.
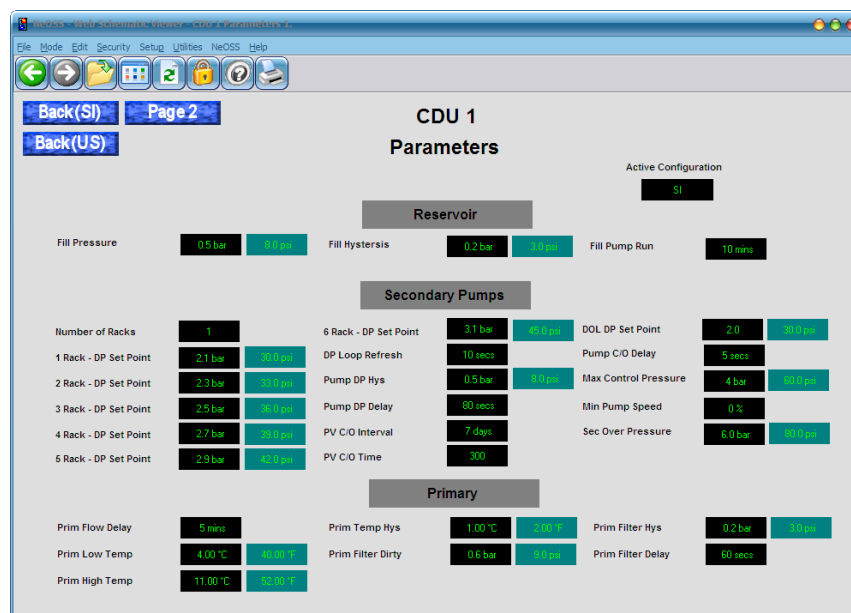
Whilst the CDU is configured to operate according to either the SI or IMPERIAL parameter set, the CDU-AC5 displays both sets simultaneously. The current active set is displayed towards the top right of the parameter schematics,
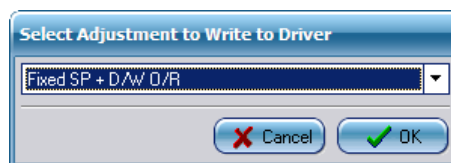
Adjusting Numerical Parameters
Click on the current value of the required parameter. A dialog will be displayed,

Using the mouse, enter the new value and click `Enter`.

Adjusting Option Parameters

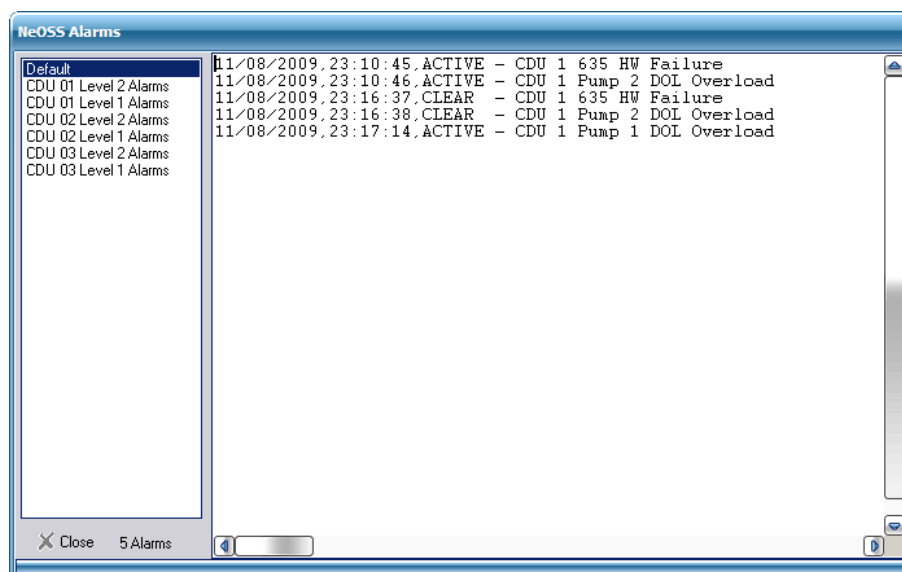Click on the current value of the required parameter. A dialog will be displayed,

Click on the drop-down button and select required option. Click `OK`

6.4   Displaying the Alarm List

From the Menu, select `NeOSS -> Alarms`

A window will be displayed as follows,

The alarm list can be filtered to display only alarms from a specific CDU by selecting the appropriate filter in the left-hand pane.